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SUMMER IN LLEYN, WITH SOME OTHER NOTES ON THE BIRDS OF THE DISTRICT.

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A PUFFIN colony is always interesting in the breeding season, but I think that at no other time is it so full of life and interest as just when the young are hatched and still in the holes. It was partly to study the Puffins at that stage, and partly to see the hills and cliffs of Lleyln when they were ablaze with the bell-heather in blossom, that I made my way down to that delectable country in the last week in July, 1905, a season when for good reasons the field ornithologist usually avoids the sea-coast places which cater for visitors. The Puffin-warren on St. Tudwal's islands is a very large one, and considering the small size of the islands the crowds of birds one sees is extraordinary. The warren is an old one. Pennant, who visited the islands in the course of his tours (1773-6), mentions that there was a small chapel on the larger island, of which a tradition still exists, and that the then present inhabitants were sheep, rabbits, and, in the season, Puffins. He does not refer to the old name Mer-cross belonging to one of the islands, and marked on Speed's and Camden's maps. The colony on the eastern island is really enormous; how many thousands of Puffins there are it is impossible to tell. Take, for instance, a piece of ground a chain wide and three or four chains long, with Puffins sitting about a

foot apart all over it. How would that work out? Then add those sitting thickly on the sea just below, those underground, and those coming and going, and this would be only a small part of the whole of the Puffins on that island. There are also great numbers on the western island. There are thousands of Puffins on Ynys Gwylan fawr. On the north-west side they sat as thickly as they do on St. Tudwal's, but the island is much smaller; still they form a big colony. On Ynys Gwylan fach there is a fairly large number; but I do not think they like this island, because the thick growth of scurvy-grass keeps the peaty soil very cold and damp, even in a dry season. I found this year that Puffins breed on the mainland between Trwyn-y-Penrhyn and Ogof Lwyd, where the cliff-top is covered with short turf and sea-pink. They nest in old rabbit-holes in the slope or in the earth bank raised along the edge of the cliff; the holes seemed to be of great depth. Others went into holes part of the way down the cliff. The birds were much more shy than those on the islands, and had I not been attracted by the peculiar sour smell of a warren and the wash and bits of small fish lying about I might have overlooked the fact that they were breeding. I soon noticed some loaded birds flying along the cliff, and then out in wide circles over the sea, and then coming in again. I had to go away to a little distance before I could watch the birds in. About fifty birds sat in a cluster on the sea down below, and there were a few others scattered about. I extracted some young from holes on the islands as big as or rather bigger than a Swan's egg. This was including the down, which stands straight up, and is an inch and a half long or more in places. At this stage the head and upper neck and throat are nearly black; body dull blackish grey; belly patch pure white; between the throat and the white of the belly a band of lighter grey; bill dull lead-grey; feet dark pinkish grey. Another rather larger bird, with wing-quills just appearing, had the mantle greyer. The young are active on their feet, and always sought cover. They ran in under us when we were stooping down, and when put at the entrance of the holes ran in like rats. When handled the young frequently uttered a piping "jerp." The nests, when there was any nest, were chiefly formed of coarse grass, grass-roots, and some old quills. Some



of the St. Tudwal's Puffins (according to the man who knows the islands best, and in whose company I have visited them for several years past) do not leave until the middle of September, although most of them go by the middle of August.* But the young must grow very fast, and no wonder when we consider the amount of fish that is brought to them. The fish-fry ("seel") I saw brought in was of various sizes, from two or three inches long up to six inches in some cases, but most of it seemed to be about three inches long. With the glass I could make out that some of it was Mackerel; there were bits of this, too, lying about. Sometimes three good big "seel" were brought, all on one side of the bird's bill; in other cases perhaps a thick bunch of small ones hanging from both sides—six or seven certainly, and possibly more. The "seel" were always held, as far as I could see, just behind the gills, so that the head was on one side and the body and tail on the other. When a Puffin loaded with fish drops on the land it almost always bustles into its hole with ludicrous haste—always when alighting among a crowd of birds—fearing robbery perhaps, though I saw no attempt at it. At other times they will stand still for a while before going in, and sometimes they pitch a yard or two from the hole and walk or run to it; but usually they pitch at the mouth of the hole and go in at once. If you are standing too near a hole the bird does not alight, but flies away again, describing a wide circle over the sea, and comes back past the place. It will sometimes do this as often as half a dozen times, always flying the same circle and arriving from the same direction. Then they either give it up and settle on the sea, or, overcoming their distrust, drop and run into the hole. When the Puffin rises from the land it first puts its feet together under it, not in an attitude of prayer, but rather as with "unctuous palms," but almost at once extends them at the side of the tail, and then gathers them (spread) at the sides of and partly under the tail. When alighting it straddles them widely. There was very little sound about the warren. Sometimes I heard underground a long-drawn, very grating "owk" or "ow"; or perhaps a long-drawn "ooooo," somewhat like one of the nocturnal calls of the cat, *i. e.* the

* In 1906 the keeper of the lighthouse wrote that they "left about the 15th August, rather earlier than usual."

long "no," from a hole after a bird had gone in with fish, and was perhaps crooning over the young one. There is a considerable variation in the appearance of the old Puffins. In some the legs are orange-coloured, and the back a hoary greyish black; these birds are smaller than some others. In the bigger-looking birds the legs are of a full vermilion-red, and the back is blacker. As to the grey on the face, one sees at this season all degrees between its presence in full degree and its total absence.

One thing which must strike an observer who visits a Puffin-warren at this season is the number of birds he will see standing about idle, with apparently nothing to do, even at this the most busy time of the Puffin's year.* It may fairly be advanced, it is true, that the Puffin which brings to its young one, when it does come back, such a good weight of solid fish has no need to be coming and going all day long like a Blue Tit, which brings at each visit nothing more satisfying than a flabby caterpillar or an unsubstantial fly. We may even allow that the parent Puffins who brought their fluffy young ones nice bunches of fish of this morning's catching may fairly be entitled to be now (11 a.m.) idle, and to pass the day, like a lot of longshore fishermen, sitting in a row (with a careful eye on the offing), until possibly, as evening comes on, the demands of the growing ball of down make it necessary to once more go a-fishing. But even if we were to go further, and even allow or suppose that each parent has only got to bring a bunch of fish once in a day (and, indeed, this would amount to a fair allowance), and could then go off duty, it would hardly seem to account for the presence of all these idle-looking Puffins. But scanning the serried ranks of the birds with the glasses I was struck with the difference in colouring and size mentioned above. And these smaller, duller birds, if they are really as yet immature and non-breeders, would solve the question of why so many Puffins in the breeding season always seem to be standing all the day idle. But young or old, there they stand in crowds, immovable, silent, Sphinx-like, staring out to sea, or turning a

* It was Edward Pugh who wrote of Priestholm in 1804 as "literally half covered with those indolent birds called Puffins." In those days Puffins were pickled and put into barrels of twelve inches long, which sold for three or four shillings each ('Cambria Depicta').

hard, cold eye on you if you approach them too closely. Content to have posed the whole world of bird-men with the great Puffin-puzzle. How without dropping the five fishes in their beak do they catch and stow away number six in that curious wrinkled "gape"? I know no pleasanter way of smoking a pipe than sitting on one of these breezy islands and pondering on this, and the other great question, Where do all the Puffins go to pass the winter?

"Amusive birds! say where your hid retreat,
When the frost rages and the tempests beat?"

Along the south coast between the foot of Rhiw and Aberdaron is a strip of rich country with good farms, but still no trees worth the name. There are hedgerows to some extent, but they are made up chiefly of gorse, bracken, and brambles. Some thorns let to go big and elders shelter the farms; they are big enough to attract the Green Woodpecker which I saw there, though it is much more common on the north coast about Carog, where there are low woods. A few hedgerow birds may be seen—Chaffinches, Greenfinches, Hedge-Sparrows, Whitethroats, and plenty of Linnets and Corn and Yellow Buntings. The bay between Trwyn-y-Penrhyn and Mynydd Penarfynydd is a beautiful one, with cliffs which, green and sloping for nearly all their height, have a richer soil than those of Aberdaron bay, and so are more bushed and bird-haunted and flowery, *Geranium sanguineum* being the most showy flower. The sand or clay of the Aberdaron cliffs is very poor and cold, and grows the poorest of floras; they are also weathering and falling away a good deal, which the eastern bay cliffs are not.

Just as in May the gorse makes yellow the prevailing colour here, so in summer purple is dominant. These Lleyn cliffs and headlands are gorgeous on a bright day. Purple in the distance, but near at hand broken up into the purple of the bell-heather, yellow dwarf gorse, and deep green bracken. The air is full of a honied scent, and butterflies are swarming—Graylings, Meadow Browns, Gatekeepers, and Blues chiefly; there are a good many Fritillaries, too (I secured a "Dark Green"), and Painted Ladies, but the rather local Graylings were certainly *the* butterfly feature. On all the higher parts of Lleyn—even Myntho Common, the

coldest, bleakest part of the coach journey—purple is the brightening colour, and when this (as in the Nant of the Horan) caps a wooded slope the effect is beyond words. The masses of ragwort sometimes make the roadsides yellow. Broad stretches of glowing purple light up Rhiw, Rhos Hirwaen, and similar places, which are so brown and gloomy in spring. And there are purple splashes on the hedge-banks, where the large harebells hardly disturb the general effect; and the dull purple of the hemp-agrimony is a feature of the roadsides on the lower ground. The great masses of bracken have now turned a deep or “prophet’s” green, and the barley is ripening, though oats are green. It is quite a barley country, and in some respects does not seem much altered since the days of Camden, who wrote of “Llein, which runneth forth with a narrow and even by-land, having larger and more open fields than the rest of the country, and the same yielding Barley most plenteously.” You can still here get barley bread. Among the floral beauties and rarities of the cliffs I found an everlasting pea (the *Lathyrus sylvaticus*) in great masses. I know, too, where to climb down the rocks and sit where the sea-spleenwort grows in profusion.

The Choughs about the Nevin bird-rock have, I believe, become almost extinct now. When I wrote my description of the rock a few years ago I refrained from mentioning them. But now they are gone no harm can be done by placing on record their former status. At the end of May, 1902, I spent the greater part of two days at the rock. On the southern side of it there is a rounded green-topped cliff frequented by Kittiwakes, Guillemots, and Razorbills, and on the southern side of that the Choughs were going into the cliff. It was not easy to see much of them, although I supposed they were feeding young. They came over the top and shot down almost perpendicularly, and then went in to the cliff below where I stood. Presently they came out, beat up the cliff-face, and flew away inland. I saw four at the same time, and came to the conclusion that there were four pairs. I saw another pair which were said to have young in a quarry in the mountain (Gwyliwr), a little back from the coast between the rock and Nevin. A pair of Peregrines were breeding in the rock at that time. The eyrie was in about the middle of the rock; in a square-shaped hollow

or small cavern, with sheer rock below and overhanging cliff above. The floor appeared to be flat, with a good growth of herbage and dark green grass in front, and two big stones in the foreground. I several times saw a bird go in, and it always went behind the stones. They brought food from inland. They were silent when they first appeared wheeling in front of the rock, but on and after catching sight of me they kept up a loud "quayk, quayk, quayk" when flying, and also when settled on a bit of rock. The male was warmly coloured underneath. They often struck at Herring-Gulls, once at a Chough, once at a Jackdaw, and twice at Cormorants, causing great outcries from the birds attacked, but doing no damage. It was a fine sight to see them close their wings, turn a little sideways, and shoot down. Cormorants were quite happily sitting on their nests just above the eyrie. I doubt if the Falcons often molest the birds breeding around them. It was very fine to hear the deep, reedy, bassoon-like "howk" of the Cormorants, repeated many times, and very quickly at the finish. This cry is uttered when the birds fly in to the cliff, or wheel past the face of the rock. I saw Cormorants often fetch sticks, &c., from disused (or temporarily vacated?) nests, and bring them to the nest on which their mates were sitting, seeming pleased and proud of what they had done, and trumpeting loudly. Other birds were lying down and bending their necks backwards, until their upper mandible rested on their lower back; they then shuffled their wings. A most curious sight. In the afternoon Cormorants seemed to enjoy flying round in great curves in front of the rock, chiefly on motionless outstretched wings. They go across the land to feed, doubtless to the shallows of the sandy south coast. Fifteen species of birds frequented the rock, and from observation and information I believe they all bred there, *viz.* Peregrine, Kestrel, Crow, Chough, Jackdaw, Rock-Pipit, Wren, Barn-Owl, Herring-Gull, Kittiwake, Shag, Cormorant, Guillemot, Razorbill, and a small unidentified blue Pigeon. It only required a few Puffins to make as fine a rock-bird station as any in the British Islands. I saw all the birds except the Owl.

To return to the summer of 1905. The young Choughs from the nest at Porth Felen got off again this year, as they always do, the nest being quite inaccessible. It was probably these

birds that I saw on Mynydd Mawr. On a fine hot morning (28th) a Chough was turning over sheep-droppings among the heather-tufts in a search for insects, and now and then crying "k'chare." At the top I surprised four together, and as I rested there another flew past close to me. Choughs are *too* tame. They appear to go some distance to feed. Returning from a long hot tramp that afternoon, I had paused, as one must, at the old water-mill to gaze down into the cool depths of the ivied wheel-case, where the Dipper has bred, and listen to the splash, splash of this ancient back-over-shot wheel (the only one I remember seeing), when the familiar ringing cry came down, and two Choughs passed over high up, and going towards Mynydd Annelog, whence eggs were sent to Wilmot as long ago as 1846 ('*Ootheca Wolleyana*'). Another day, before breakfast, a pair came along the coast, over the church, and headed for the same place, mobbed on the way by four Jackdaws. From a boat when under Penrhyn Du I saw a little place in the cliff which looked as if a hawk had nested*—a little shelf part of the way down a perpendicular crevice—and was told that in the spring a pair of Choughs came and tried it; they appear to have found it unsuitable, but bred that year on Llanbedrog Head, not far away. One at least of the young ones had been taken, and was then flying about by the quay at Abersoch. It was absurdly tame, biting at your fingers, and afforded a nice opportunity of studying the most graceful flight of this beautiful bird. I saw a pair on Pen Cilan. One pair there had their eggs taken, and the other pair, which used to breed in a cave, do not appear to have nested there this year. I watched a pair on Penrhyn Du. One of them sat preening itself on a bit of old rail in one of the cross-banks just outside the big bank separating the heathery cliff top, which is open to sheep, from the partly cultivated land inside. It was a well-used spot, and "castings" lying on the ground showed that the birds had been eating barley already. I have seen birds there in former years. Having picked up some quills and enjoyed the unusual experience of cleaning my pipe out with a Chough's primary while I watched the birds feeding and flitting about a pasture, I moved on. There were many Stonechats about wherever there were any bushes; some Pee-

* A few years ago a Merlin did so close here.

wits and Curlews. The cries of the latter are very soft now, "curlewee"; and I heard also the mellow flute-like migratory call, "klee-tler-wer," which I have sometimes heard from birds passing over at night in Oxfordshire. Passing Pistyll Cim (where some Herring-Gulls nest on the cliff), I drank of the "sweet water" of the clear spring, where such a lot of bog-pimpernel was flowering, and, rounding the stony-topped Trwyn-yr-Wylfa where you almost always see Shags, descended to Porth Caered, whose sweeping slopes drop to the sandy beach, and are covered with short bracken seared by sun and salt winds, and varied here and there by a few tall mullein plants. The bracken is followed by marram-grown sands, and a low bluff separates this from the sandy shore. How few birds one sees in these bleak, wintry-looking spots! From here I made my way to the undercliff beneath the fearful precipice of Pared Mawr—an eerie spot that evening. A few Herring-Gulls had not yet got their young away (July 25th). There were two in a nest on a pinnacle of rock, and I got close to another (full-fledged) on a ledge. The old Gulls made curving swoops over me with a swish of wings and angry cries of "ag-ag-ag" and "kiow" as I stood under the mighty rock-wall, with Cilan to the west almost hidden and looming mysteriously out of the white mist creeping in from the sea on the soft south air. Down below the sea was so clear that all the stones at the bottom and the brown seaweed could be seen clearly. The cries of a pair of Kestrels (common birds along the cliffs I am glad to say) rang out with surprising loudness. But Cilan was soon quite blotted out, and I thought it advisable to get out of the rocks, for the sea-mists of Lleyrn are sometimes inconveniently thick. A Corn-Crake was calling as I walked home. A clutch of eight eggs of this bird, quite fresh, was waiting for me. They had been mown out of hay-grass a day or two before the 24th—rather a late date. Failing a knowledge of the English name, it was well described as "a brown collar bird, and it ues to sing at night."

But to go back to my notes on Gulls. On the cliff at St. Tudwal's Islands on the 25th there were only two nearly full-grown young ones. On the 27th I landed on Ynys Gwyllan fawr and fach, and found on both many adult Herring-Gulls, which breed there in numbers. They were almost as noisy as in spring,

but I could not see any late young ones, nor indeed was there a young bird of any age in sight on the wing or otherwise, and, although of course a young one or so might have been hidden in the rocks, it was quite certain that practically all the young were gone. There is a part of the low coast of Merioneth across the bay where all the early summer at all events numbers of immature (and some adult) Herring-Gulls are always to be found, and as none are bred on that coast it is reasonable to suppose that the young birds bred in Lleyn resort at once, as soon as they are strong on the wing, to the sands and adjacent marshes of Merioneth, and there pass their earlier years. I have previously remarked on the comparative scarcity of immature Herring-Gulls in Lleyn. I saw a very few brown young on the wing about the deep cliff-enclosed inlet called Ogof Lwyd, where there is a stack a little way out, on which, however, I did not think any birds bred. About a score of Kittiwakes (their greenish beaks noticeable) sat on steps of the steep black cliff by the small deep cave at the south-east corner of St. Tudwal's, and looked at a little distance just as if they were breeding, but they only come after Mackerel "seel." As they flew up they broke out into their chorus of cries, which I could hear occasionally from the mainland. Their appearance there probably gave rise to the erroneous idea that they bred on St. Tudwal's. There were, of course, many about Pen Cilan, where they breed in numbers. The Great Black-backed Gulls had bred in one old haunt, and when near them one morning the deep "ag-cag-cag" drew attention to a grand old bird circling overhead. Black-headed Gulls were very numerous—both adult and young—in the green marshes chiefly, and in Pwllheli Harbour, though there were some on the shores at various places, where they were very noisy at night. Most of the adults had already lost, or almost lost, the dark hood.

(To be continued.)

AN OBSERVATIONAL DIARY ON THE NUPTIAL HABITS
OF THE BLACKCOCK (*TETRAO TETRIX*) IN
SCANDINAVIA AND ENGLAND.

BY EDMUND SELOUS.

(Part I. SCANDINAVIA.)

(Continued from p. 29.)

April 30th.—*In situ* by 3.30 a.m. The whole air is obscured by heavy mists, and the sky palled in clouds, yet, notwithstanding, quite a hubble-bubble of rookling is going on, as well as "tchu-whai's," "choc-kerada's," and the "chucking" of hens—also a sharp whisking sound, which has more of a whistling intonation than I have yet heard.

Now, with the lightening, and somewhat earlier than usual, all this ceases, except for an occasional bird or so. This cessation is a very marked feature. On the morning when I unfortunately came late, and found the birds on the ground, this was at about 5 a.m. It would be contrary to my experience, on every other morning, had there not been this pause, and the probability is that the birds had not been long down—or, at any rate, active—when I came. The stillness is now complete. "Roorr-roorr-roorr," as a preliminary, and then the rest—that sentence—is the Blackcock's full rookle or whirlble, and this is repeated over and over again for an indefinite period. At intervals there is a sort of break in the note. "Rerr-rerrker-rer-rer-rer" the bird says, then, in a higher key, and then the other recommences.

I have just heard, for the first time, the soft-sounding, but bellicose, "choc-kerada" note, uttered in a tree. It was by one of two birds, in two birches, not far from each other. One of the pair now flies down, though not into the arena, and the other, still in his tree, utters the note several times; then he flies down too. All the notes, then, may be uttered as well

perched in a tree as on the ground, though, on a short acquaintance with the bird, it would seem otherwise.

No bird has come down upon the courting-place, and as it is, now, as I suppose, past 7 a.m., there is no likelihood of it.

May 2nd.—This morning was quite a blank (yesterday, as it was raining, I did not start). It seems now as though the place, rather than the season, were to blame. The game-laws not being enforced, men from the settlement are out with guns every morning, and this may make the birds shy and wild, and prevent them coming down. The weather, however, is very bad, and may have something to do with it.

May 4th.—At place at the usual time—about 3.30 a.m.—but there was nothing to record till much later. It was a dreadful morning—cold, heavy with clouds, and sometimes raining a little. There being small signs of activity, on the part of any birds, about 6 a.m. I gave it up, and was walking back, when it struck me that appearances were now a little better; more birds seemed coming into the trees round about, with rooklings and “tchu-whai’s” on the increase. I therefore sat down under a fir, on a rising knoll commanding another, though not quite so good a view of the arena, and had not long done so when a cock flew into a small Scotch fir, close to where, had I stayed where I was, I should have been sitting. From here he flew into another tree, and then into one or two more, as I thought from mere restlessness, till I noticed a hen in a tree near, and when she flew to another, he did so too, as had no doubt been the case before, and soon both went down amongst the firs to that side of the arena. After a time, however, they flew up again, perching in contiguous trees, as before, and now the hen began to “tchuk, tchuk” loudly, and kept on doing so for a considerable time. Here, again, we have, not an “indifferent,” or “passive,” spectator of these nuptial performances—a sort of stuffed bird for live ones to dance in a ring about, such as we have been asked to believe in—but an interested participator in them.

All at once, two or three cock birds flew into the arena, and were, before long, followed by others, and a few hens—three or four of the latter to some half dozen of the former. Now there was some real fighting amongst the cocks, confined, however,

almost, if not entirely, to two who seemed to pick each other out, one, in particular, being nearly always the seeker. They fought in the ordinary manner, sparring up against one another, and, I think, seizing hold with the beak; but though, as I say, it was real fighting, it was not remarkably violent, and did not last long at a time. After a bout of it the bird who had sought the encounter by entering his opponent's territory, got back again into his own, and, having paid some attentions to a hen or two, would again come swelling up, and being received, by the other, with a bold front, the duel was continued.

There was, now, a fair amount of courting, on the part of various males, but, owing to the nature of the ground, which, though flat, is uneven, and set with tufts of a wiry, brown heather, I could not follow this nearly so well as I should have liked to; the hens particularly, on account of their smaller size, and brown, heather-like colouring, were often invisible, coming into sight only at intervals, and shortly disappearing again. For these reasons I was only able to get general impressions, and can give no detailed account of this or that episode. It appeared to me that, in the manner before described, the cocks went round the hens in rather a wide circle, and that the *raison d'être* of this was the showing to advantage of the white tail, which, as the male walked forward, after passing the hen from behind, was presented directly to her view. Also, whilst the actual courting was taking place, the cocks, as I thought, though now in close proximity to one another, were less inclined to engage in combat, the martial spirit seeming to be in abeyance, or put aside for the more important matter of the display; but again, lest it should be forgotten, I draw attention to the fact that the martial spirit, all along, has been remarkably tame. For the hens, whenever I could see them, they certainly seemed to know they were being courted, but to what extent they were impressed, and whether the object of the males was in any case achieved—though I do not think so—I was unable, for the reasons above given, to say; I believe, however, that, under such conditions, it is easier than one would imagine to be mistaken on this point.

The scene ended by all the birds flying off, on a sudden, just as they might have done had a gun been fired, but there was no

sound that I could hear, and nothing, I believe, had disturbed them. It was evidence of this, I thought, since a distant shot would not have disturbed them at all, that they did not fly right away, but only into the trees that closely skirted the arena, and also that one or two males returned, again, though there was no further gathering. Thus spontaneously, then, and in so sudden a manner, may the meeting break up.

May 5th.—No birds came down this morning, and not only so, but the rookling round about was much fainter, and I hardly heard another note. A shot before I arrived—for I was only there at 4.30 a.m.—may perhaps have accounted for this; but, looking back, I cannot now recall that the birds uttered their usual cries, yesterday, when in the arena, and, even in the trees, I think they were less than before. It was a wretched morning, and cold, but hardly, if at all, more so than yesterday.

May 6th.—On spot about 4 a.m. The arena was empty, but, shortly after the sun had risen, two birds flew down into it, one closely following the other, and, from the positions which they took up, I judged them to be the two combatants of my last observations, for I made none yesterday. They immediately began making little flights over the ground, with springs into the air, and, getting together in this way, were soon *aux prises*. The fighting, however, was of the most timid and half-hearted description, and, after a few very disappointing bouts, it ceased altogether, and each bird took up its position in a certain part of the ground, corresponding with last time. Here, for upwards of an hour, as I should suppose, each bird rookled, "tchu-whaied," and made, at intervals, those little springs into the air, out of which it is easy, now, to see that the more developed "dance" has been evolved. These were, this morning, of a more definite character than I have hitherto seen them, and consisted of a leap up, and a little forward, in which the wings were fluttered, and then a drop, plumb down, when, I think, they were closed. As each bird sprang, he uttered a deep and prolonged "chorrrrr," and, on coming down, made a few steps forward, and sprung again. Now this was what the bird in Norway did, except that he leapt continually, without stop or pause, and uttered, all the while, not one note only but a series of most extraordinary ones, which often sounded like violent

hisses. He seemed to go mad, in fact, and, both in voice and action, gave much more the idea of a rampant cat than a bird. By all appearances he was a very great brave, a mighty warrior of the tribe, but when another bird flew down into the space where he was performing, he retired—nay, ran out of it—in the tamest way possible; so that the sudden transition from the raging thing he had been, to *this*, had something the effect of an optical illusion—the eye was amazed by it.

In fact, with the Blackcock, as with other birds, bellicosity seems to go hand in hand with timidity, and it may be out of these two elements, possibly, that the “war-dance”—so to call it—has arisen. I am theorizing on what I have seen. Had these two birds been as bold as they were hostile, had they felt no nervous sensations, they would have fought, instead of leaping and “chorriring”; but they were afraid, or half afraid, to fight, and these antics were a relief to their feelings. Animals, in their psychology, are like pictures which resemble us in outline, but want the shading. They have our grossnesses, so to speak, but not our refinements. Thus, a bird might be afraid of another bird, but it would not be ashamed of being so, and so would do nothing on the principle of saving its face, or trying to disguise its own feelings from itself. Still the wishing to fight, and not daring to, would certainly produce mental discomfort, for which some relief must be found, and it is not easy to imagine a better one than violent actions, which, prompted by the very same feelings, which, without the check of fear, would issue in battle, might in time become, to some extent, a substitute for this. Thus, amongst ourselves, men who both lack courage, and are of a low, coarse nature—Pistols, not Connachers—find relief for the failing, in boasting and braggadocio, and we may here, in essential elements, see, approximately, the same thing, for in human psychology, too, there is more or less *shading*.

If, then, the dancing of the Blackcock be something distinct from the nuptial display, it need not, for that reason, be either a challenge, or a means of “getting up” courage, nor yet the mere safety-valve of sexual excitement. It may be, rather, (though all these various elements may play a part) a substitute for actual battle. Nothing, to look at it, can be more exhilarating, and, while it has none of the disagreeables of fighting, it cannot

have less influence on the choice of the female bird, if, as I believe, she is not won by fighting, but by courting. In fact, with such a resource as this, blows might, to a large extent, be dispensed with, and, in the one case where I saw the thing in its perfection, they certainly were.

I thought, naturally, with these two birds down, and such a morning as this—for it was fine and sunny—that more would follow, and that I should see something of the sexual relations of the species. However, “I was the more deceived,” for no other bird came down at all. These two continued to act as described, at intervals, and also to rookle, but they got gradually tamer, and did not again approach one another. About 7 a.m. they flew off suddenly, just as had the whole assemblage, two mornings ago, though here, again, I do not think anything had disturbed them. Perhaps, therefore, it may be natural for the meetings to break up in this abrupt manner.

The above was the last observation on the nuptial habits of the Blackcock which I was able to make whilst in Sweden.

(To be continued.)

THE "ASTERISCUS" IN FISHES.

BY COLONEL C. E. SHEPHERD.

INSIDE the skull of Teleostean fishes there are six otoliths, concretions of limestone, nearly pure carbonate of lime, that are contained in the membranes of the auditory labyrinth; they are placed three on each side. One, much larger than the other two, is the *sagitta* of scientists, and is familiarly known as the "earstone" or "earbone," but in the families of the *Siluridæ* (Catfishes) and the *Cyprinidæ* (Carps), however, it is not the largest, as mentioned hereafter. To the otolith that is found in the "*lagena*" of the *sacculus* the name of *asteriscus* has been given. The third stone is known as the *lapillus*. The *lagena* itself, a more or less pronounced prolongation of the *sacculus*, according to the fish to which it belongs, is looked upon as a rudimentary *cochlea*. The *asteriscus* usually shows the same constancy to the characteristics of the family shape as the otolith known as the *sagitta* does. Retzius,* in his monumental work on the 'Auditory Organs of the Vertebrate Animals,' vol. i., gives in the plate relating to the "*Lepidosteus osseus*" an illustration, natural size, of the *asteriscus* in this fish. It is a little circular stone one-sixteenth of an inch in diameter, and fairly circular in shape. In the plate referring to the "*Amia calva*" in the same work an illustration is given, natural size, of its *asteriscus*, a rounded pear-shaped stone, three-eighths of an inch in length by nine-thirty-seconds of an inch at its broadest part. In another work† by the same author, in pl. iv. fig. 11, he gives a drawing of the *asteriscus* of the Pike (*Esox lucius*), and in pl. iv. fig. 28, a drawing of a similar stone taken from a fresh-water Bream (*Abramis brama*). This exhausts, as far as is known, the detailed illustrations of the *asteriscus*. The mere outlines given in all the plates, with the magnified drawings of the ear-membranes in all the other plates of the first work by Retzius, referred to above, whilst interesting as recording their shapes, show nothing more than outline. The plate accompany-

* 'Das Gehörorgan der Wirbelthiere.'

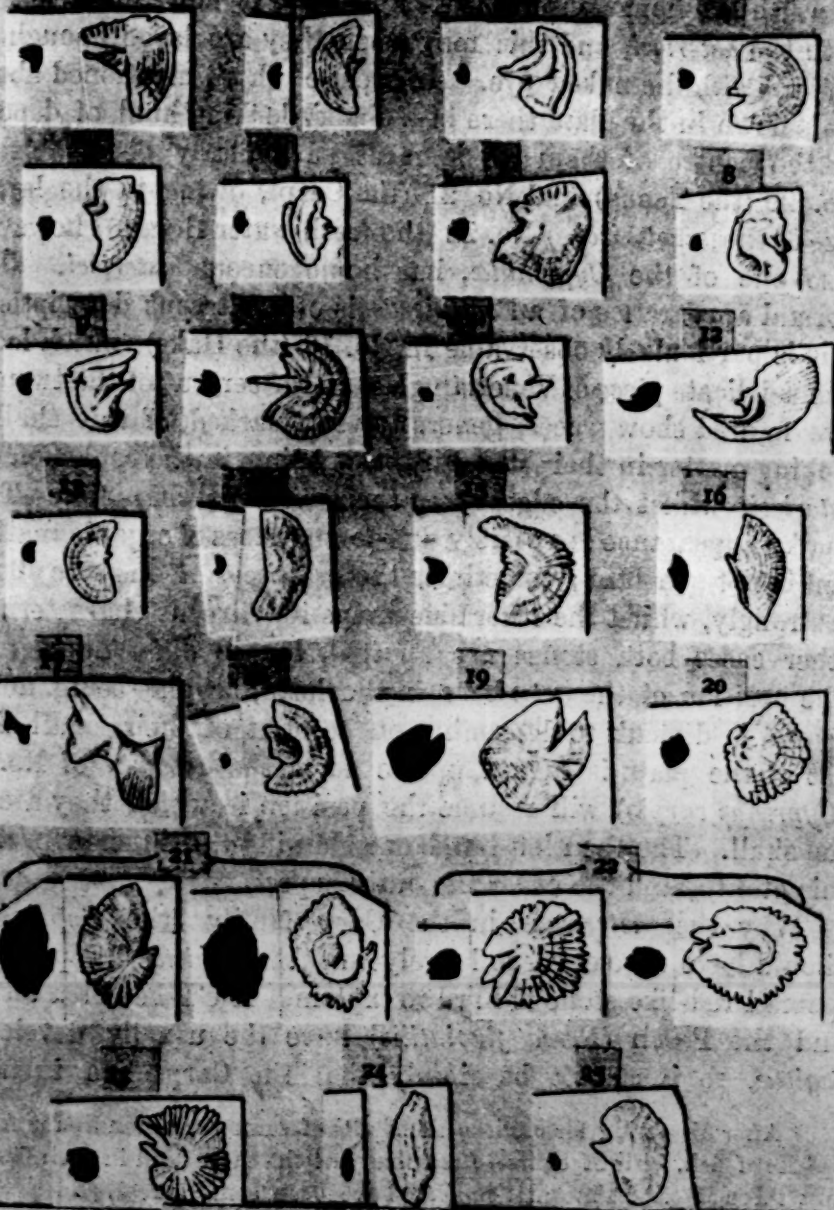
† 'Anatomische untersuchungen, Erste Lieferung.'

ing this paper has been prepared most carefully to give an idea of the varied markings and the indentations on the edges of these stones. The small black illustrations represent the actual size of the *asteriscus* next to it. It will be readily seen that it is only by making a magnified drawing that these various markings and the indentations of the edges can be appreciated. The following tabulated form shows the family and the fish from which the different *asterisci* in the Plate were taken; only some of those fishes having a fair-sized *asteriscus* are given, as many an *asteriscus*, *e. g.*, those of the smaller Blennies and Gobies, is so minute as to be as small, or even smaller, than any full stop in this page of print. Rather more of the *asterisci* of the "*Cyprinidæ*," or Carp family, have been shown than of other families, as their *asterisci* differ from those in other Teleosteans very materially in being the largest of the three otoliths in each side of the skull.*

No.	Family.	Scientific Name.	English Common Name.
1	<i>Percidæ</i>	<i>Serranus gigas</i>	Dusky Perch (Couch).
2	"	<i>Dentex vulgaris</i>	Dentex (Couch).
3	<i>Squamipinnes</i>	<i>Drepane longimanus</i> ..	From Indian Ocean.
4	<i>Mullidæ</i>	<i>Mullus barbatus</i>	Red Mullet.
5	<i>Sparidæ</i>	<i>Cantharus lineatus</i>	Old Wife (Couch).
6	"	<i>Pagellus erythrinus</i>	Erythrinus (Couch).
7	<i>Scorpenidæ</i>	<i>Sebastes norvegicus</i> ...	Bergylt (Couch).
8	"	<i>Scorpena scrofa</i>	From Mediterranean.
9	<i>Sciænidæ</i>	<i>Otolithus maculatus</i> ...	From Indian Ocean.
10	<i>Carangidæ</i>	<i>Caranx trachurus</i>	Horse Mackerel.
11	"	" <i>armatus</i>	From Indian Ocean.
12	"	<i>Lichia amia</i>	From Mediterranean.
13	<i>Scombridæ</i>	<i>Pelamys sarda</i>	Pelamid (Couch).
14	<i>Cottidæ</i>	<i>Trigla cuculus</i>	Elleck (Couch), a Gurnard.
15	<i>Mugilidæ</i>	<i>Mugil capito</i>	Grey Mullet.
16	<i>Gadidæ</i>	<i>Merluccius vulgaris</i> ..	Hake.
17	"	<i>Gadus luscus</i>	Whiting Pout.
18	<i>Pleuronectidæ</i>	<i>Solea vulgaris</i>	Sole.
19	<i>Siluridæ</i>	<i>Arius gagora</i>	From Indian Ocean.
20	<i>Cyprinidæ</i>	<i>Tinca tinca</i>	Tench.
21	"	<i>Cyprinus carpio</i>	Carp.
22	"	<i>Abramis brama</i>	Fresh-water Bream.
23	"	<i>Leuciscus rutilus</i>	Roach.
24	<i>Esocidæ</i>	<i>Esox lucius</i>	Pike.
25	<i>Clupeidæ</i>	<i>Chanos salmoneus</i>	From India.

* It is well perhaps here to note that in the *Siluridæ* the *lapillus*, the otolith of the *Recessus utriculi*, is the largest otolith.

ASTERISCUS.



A. H. Searle, del.

With the exceptions noted as from the Indian Ocean or the Mediterranean, all the other fishes of the list are to be found in British waters.

There are sixteen families represented. As a rule the *sagittæ* in a fish are homogeneous in texture;* it is more often not so with the *asterisci*, and this may when they are large enough be noticed with the naked eye. In most of those mentioned above and shown in the plate there is a chalky-looking kind of deposit in the centre of them; it is most particularly observable in No. 20 (the Tench) and No. 21 (the Carp), owing to the larger size of these *asterisci*. No. 22 (the fresh-water Bream), however, also one of the *Cyprinidæ*, has homogeneous *asterisci*. The normal appearance of an *asteriscus* is of a vitreous description; this is particularly observable in No. 16 (the Hake), which looks like a delicate piece of Venetian glass. Fifteen out of the twenty-five figured show traces, generally very marked, of this chalky-looking matter in their structure, this being in the centre of the *asterisci*, whilst the edges keep their vitreous character. This chalky appearance is possibly due to an excess of organic matter, and is not constant; sometimes the *asteriscus* of one side shows it strongly, whilst the other side keeps its vitreous character; in other cases both stones are affected, but in different degrees. The position of the *asteriscus* in the head, beyond being in the *lagena*, is difficult to determine on account of their small size, but if the plate is turned upside down the *asterisci* of No. 21 (*Cyprinus carpio*) will assume the position in which they are in the skull. The then left-hand one showing the inner aspect of this otolith, and the other the outer aspect.

Why the *asteriscus* in the Carp family (the *Cyprinidæ*) should have developed so largely and the *sagitta* dropped into a small rod-like stone is hard to explain. The Pike (*Esox lucius*) and the Perch (*Perca fluviatilis*) have the usually developed *sagittæ*, so it cannot be simply that the Carps live in fresh

* After dissecting for otoliths the skulls of some three hundred different species of fish, with of course often many of the same kind in each family, only three cases of abnormal *sagittæ* have been come across, and these in eighty species of fish from northern waters. The other two hundred and twenty species from the Indian Seas off Madras and the Mediterranean did not produce a single abnormal *sagitta*.

water, for those two fishes do the same. The Carp family have their auditory organs in connection with their air-bladders, but so have several of the *Clupeidæ*, e. g., the Herring (*Clupea harengus*) and the Pilchard (*Clupea pilchardus*);* these have the *sagitta* as the largest otolith. Certain also of the *Serranidæ* (Perch family), *Sparidæ* (Sea-Bream family), and *Gadidæ* (Cod family)* have a connection between the air-bladder and the auditory organs; all these families have the *sagitta* as the biggest otolith. True, they have the connection between the air-bladder and the auditory organs arranged on a different plan to that adopted in the anatomy of the Carps, but are mentioned to show that it is not due simply to the fact of their air-bladder and auditory system being connected that makes the arrangement necessary to increase the size of the *asteriscus*. Again, the *Siluridæ*, which have the same method of connecting the air-bladder with the auditory organs, as in the *Cyprinidæ*, viz. by a series of movably connected ossicles, have the "*lapillus*" as their largest otolith (see note *ante*); their *asteriscus*, though well developed, is relatively small compared to that in the Carp family. A point of resemblance in these two families is that each has a rod-like *sagitta*.

The *asteriscus* of the more strictly *Gadus* branch of the *Gadidæ* (the Cod family) differs materially in shape from that in other Teleostean fishes, as exemplified by No. 17 (the Whiting-pout); the same stone, No. 16 (the Hake), classed with the *Gadidæ*, is much the same as the other fish examples shown, its resemblance to Venetian glass having already been noted.†

One characteristic of the shape of the *asterisci* that seems to be common to a great many families is the little spike that projects from the middle of one side; it is apparent in sixteen out of the twenty-five figured. It is so delicate as to be very easily broken when dissecting this stone out of the ear-membranes.

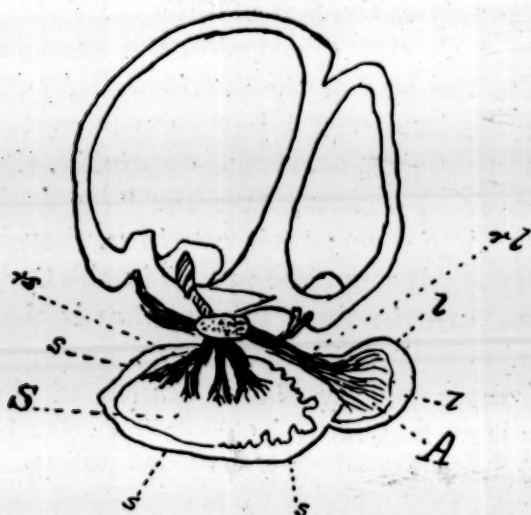
Upon what are the actual uses of the otoliths in the working life of Teleostean fishes authorities are not agreed. The older

* *Vide* 'The Cambridge Natural History,' vol. vii. p. 389, quoting Bridge, Ridewood, E. H. Weber, and Bridge and Haddon.

† The *sagitta* in the Hake, a long thin stone, is also markedly different to that of the true *Gadidæ*, which have a solid thick stone.

men of science saw in them only a means of increasing the sound vibrations, and so making the hearing of the fish more acute. Some modern authorities seem to see in them only an organ to enable the fish to retain its equilibrium in the water, and point to cases where, when the otoliths have been removed, together with the semicircular canals, the fish has not been able to remain in its usual vertical position. Others, and possibly more correctly, credit the otoliths with the dual functions of helping the equilibrium, as well as assisting the hearing. Why three on each side of the head are needed no one has

PAGELLUS CENTRODONTUS.



[After Retzius.]

A. asteriscus : S. sagitta : l. lagena ; s. sacculus ;
rl. Ramulus lagenæ ; rs. Ramulus sacculi.

attempted to explain. But whatever their office is, it is clearly very important when one sees the number of nerve filaments spread over the *sacculus*, and also that end of it called the *lagena*, showing that the *asteriscus* carries on its full share of the work done by the otoliths. The accompanying drawing, reduced from the first-mentioned work of Gustaf Retzius, depicting the auditory organs of a "*Pagellus centrodontus*"

(a sea-water Bream), shows the situation of the nerves. It may be taken as fairly typical. It shows the *asteriscus* and nerve, the *Ramulus lagenæ*, or the Branch of the *lagena*, spread root-like over the outer surface of the *lagena*, just over the place where the *asteriscus* is situated.

In concluding this article, the assistance received, given by the courtesy and liberality of the administration of the 'Stazione Zoologica,' Naples, must be recorded; without it many of the specimens here shown could not have been brought to the notice of the reader.

SOME FISH-NOTES FROM GREAT YARMOUTH FOR 1909.

BY ARTHUR H. PATTERSON.

AN error inadvertently made by me in "Notes for 1908" (Zool. pp. 445, 449) it would be well to correct. Crucian Carp, referred to as occurring numerously at Lound, should have been Prussian Carp (*Carassius gibelio*). During the summer of 1909 I was fortunate in obtaining examples of *C. vulgaris* (the Crucian Carp), the Mirror Carp (*Cyprinus specularis*), and a hybrid, identified by the British Museum authorities as between the Common and Crucian Carps. Several of the latter have lived for some time in amity with some *gibelio* in one of my tanks.

The past year has brought to notice several deformities among Cods, the "bull-dog" variety, with shortened upper lip, in particular; and on January 5th I examined an example with a badly distorted under jaw, the result of an accident; the barb or labial cartilage was growing on the right side instead of depending amidships below.

A few boats put out after Shrimps as early as the first week in January. Several very good catches of "Pinks" (*Pandalus annulicornis*) were brought in on the 8th, many of them being large in berry. I found them also in spawn in February.

January 23rd: Sprats still being taken. I had some for tea, individuals containing roe and milt.

From the 'Angler's News' annual list of large fishes taken by sea-anglers I culled the following for Yarmouth:-- November (1908), Dab (*Pleuronectes limanda*), 1 lb. 8 oz.; October 16th (1909), Flounder (*Pleuronectes flesus*), 3 lb. 15½ oz.

A Jago's Goldsinny (*Ctenolabrus rupestris*), of a beautiful pink colour, 3¾ in. in length, brought me by a shrimper's boy on April 26th. It smelt very much like celery. A Ballan Wrasse (*Labrus maculatus*), of the green variety, 9 in. in length, was taken in a draw-net the following day.

American Rose Perch (*Scorpena dactyloptera*): a six-inch example sent me from Lowestoft on May 13th.

On May 19th, for the first time, I fell in with the Burton Skate (*Raia alba*), the young of which, as depicted by Couch under the name of the Bordered Ray, is distinguished by a well-defined wide border of black upon the white under side of the fish. My fish, which was $11\frac{1}{2}$ in. long and 8 in. across the disc, I despatched to the late Mr. T. Southwell, who had no hesitation in referring it to the above species. The upper side was drab-coloured, with no spiny process anywhere but on the tail, which contained three rows of spines, and there were one or two against each eye. This was the last fish, of a goodly number, which my dear departed friend was delighted to receive from my hands.

Blue Mackerel: I received my first whole-coloured Blue-backed Mackerel (*Scomber concolor*), a fifteen-inch specimen, on May 25th. A second came to hand on June 1st, 14 in. long, and a third two weeks later on.

On June 1st I examined some fine Plaice from the White Sea. I noticed that the spots were a bright orange set in a faint white ring. One fish in particular, which had a dark under side, and the corresponding spots (for when a Plaice is coloured below it is also spotted, wherever the colouring may extend to) had them also set in a ring of white.

A very beautifully marked Brill brought me on June 29th from Lowestoft (*vide* Zool. 1909). The groundwork of the upper surface was white, with spots and blotches of the normal colour prettily arranged.

I observed some "Dogs" on a fish-slab in a back street on July 12th. One, a large Tope (*Galeus vulgaris*), was destined for the frying-pan; another, also fated to share the same honours, was a Picked Dog (*Acanthias vulgaris*), 3 ft. 3 in. long, weighing 9 lb., a very large example for this coast.

Salmon: a $14\frac{3}{4}$ lb. Salmon was netted on Breydon during the second week in August.

A lady angler, fishing from Claremont Pier, Lowestoft, had an exciting time on August 4th with a Sting Ray (*Trygon pastinaca*), which she successfully landed, to the great interest of less fortunate anglers; it weighed 35 lb.

Herring-fry was remarkably scarce on local waters during the month of August. Breydon usually teems with the silvery little "syle," to the great delight of the Terns, which flock thither under normal conditions to feast upon it, and of the Gulls that gorge themselves with those left stranded among the *Zostera* when the tide falls off the flats. The Terns were conspicuously absent during all the autumn.

During a stroll along Gorleston beach on August 26th I saw a great number of Lesser Weevers (*Trachinus vipera*) washing about with Little Squids (*Loligo rondeletti*) and tiny Pollacks, &c., the refuse from the draw-nets and shrimp-nets. Some visitors' children were playing "shops" with a number spread out upon a box; some of these were among the finest specimens I ever saw. How those children escaped injury from the fishes' poisonous dorsal spines was to me more than marvellous. Young Pollacks a few inches long came up river numerous from the sea in September.

In the middle of September a curious inshoring of Herrings was noticed at Lowestoft, the fish coming quite into the breakers, and many were flung up in the wash of the sea. Young urchins, armed with baskets, fetched them out, to their own great delight.

A Smooth-hound (*Mustelus vulgaris*), about 15 in. in length, cast up on the south beach, September 30th.

On the evening of the same date I was visited by two fellows from a neighbouring public-house, who begged me to return with them to see a curious fish which no one could name. I accompanied them thither, to find the bar crowded with rough fellows in various stages of intoxication and excitement, while bets were being freely made upon the creature, and upon my decision. A space being cleared by "Toby" Blake, a local Eel-netter, and to whom the fish belonged, it was shot out of a large rush basket on to the sawdust-covered floor. It was a vile-looking object, almost black in colour, the eyes covered with a white film, and the whole being flabby and offensive to the touch and smell.

"Now then, 'bor, *what* is it?" asked several husky voices. I examined it as well as the haze of pungent tobacco smoke and the gloom of many shadows would allow me, and pronounced it

a huge Broad-nosed Eel. "That's what I say," remarked "Toby" Blake, in a husky voice. Others protested it was a Conger, but the position of the dorsal fin and its general appearance were against the latter. Blake informed me it weighed 24 lb., and I myself measured it at five feet in length, with a circumference equal to an average man's thigh. Rumours were rife that it was taken in the neighbourhood, but I afterwards learnt it had come from some northern river, and sent by Blake's son, who was fishing out of a Yorkshire port. The largest Eel record for Yarmouth was described by a local historian as taken in the Yare, a mile below Yarmouth Bridge; he called it a "Silver Eel." Length, 6 ft. 1 in.; 21 in. in girth; weight, 42 lb.

Being informed, on October 18th, that near the harbour-mouth I should find a stranded sea-monster, I accordingly rambled thither, to find the putrid remains of a Porbeagle Shark (*Lamna cornubica*), which had probably been taken in a Herring-net and cast adrift.

An inshoring of Whitings was noted early in October, great numbers being taken by sea-anglers from the piers; whilst at Lowestoft they were caught in thousands.

Early in the month of October two large Cods were observed tumbling about in the breakers, within a few days of each other; they were fished out with walking-sticks. One weighed 24 lb., the other 27 lb.

Several Five-bearded Rocklings (*Motella mustela*) were taken in October and November.

A Flounder coloured on both sides, and with one eye on the "edge," was sent me from Lowestoft on October 28th. It was 10 in. in length.

During the week ending October 29th there had been some catches of fine Soles on the local piers. A visitor fishing from the Britannia Pier caught in the morning one weighing 1 lb., in the afternoon one weighing 1½ lb., and in the evening a still larger one scaling 1¾ lb. This was on October 21st.

Great numbers of Scads (*Trachurus trachurus*) captured in the Herring-nets at end of October.

Pollack: another inshoring of this species, averaging 7½ in., all along the coast. Early in November.

I saw some very fine Smelts (*Osmerus eperlanus*), taken on

Breydon, November 3rd. Several were quite as large as full-grown Herrings.

A very curious incident occurred in Yarmouth Roads, when a Middlesborough steamer encountered strong winds and heavy seas. When abreast of the town a particularly heavy sea was shipped, and when the water had receded the deck was found to be half-covered with Mackerel, a species which was exceedingly abundant on several occasions during the Herring fishing. Many of the Mackerel were washed back into the sea through the scuppers, but enough were secured to serve the crew with fresh fish for two or three days.

On November 25th Mr. Robert Beazor exhibited on his fish-slab a very pretty little Sunfish (*Orthogoriscus mola*), which had been taken in a drift-net and landed on the fish-wharf. It measured $25\frac{1}{2}$ in. in length, and from tip of dorsal to tip of anal fin, 36 in.; weight, $26\frac{3}{4}$ lb.

A Sprat famine characterised the East Suffolk fisheries during the end of 1909.

I have to thank Mr. Robert Beazor for the following notes on the local Smelt fishery of 1909. He writes:—"The Smelt season commenced in the beginning of March, the Gorleston fishermen starting, when some six or eight boats landed catches varying from three to eight score. They were exceptionally fine fish. Many of the river smelters had given up and sold their nets and boats because of the action of the Bure and Yare Commissioners, who debarred them from fishing above Breydon [a very senseless procedure, as no fresh-water fishes come down so low as the confluence of the two rivers, nor for miles above it, owing to the constancy of salt water, which goes higher up rivers year by year]. This caused a certain supply of Smelts to diminish. April was a fair month, and when the weather allowed the beach boats to work some procured from thirty to forty score a day. The largest Smelt I weighed was 22 oz., and I have had as many as fifty Smelts in on one day weighing 16 oz. apiece. The autumn fishing was a failure; what few were taken were secured at the top end of Breydon. I sent away sometimes as many as four thousand fish per diem—a much lower figure than in some years. Prices were remunerative to the catchers, who averaged two shillings per score, the highest

price being three shillings and sixpence ; they were occasionally as low as one shilling per score. The large import of Dutch Smelts into London greatly influenced the English supplies, although the latter always command the higher prices. Very few Grey Mullet or Salmon-Trout were netted with the Smelts, owing undoubtedly to the wretched summer. Drawing for Trout along the coast was also a failure. My largest lot at any one time this year was 80 lb. My largest Trout was $10\frac{1}{4}$ lb., an example $16\frac{1}{2}$ lb. being my record fish. Very few Salmon-Trout and Red Mullet were taken in the Mackerel-nets this year ; last year I purchased Red Mullet by the trunkful ! Numbers of what we call ' Red Trout ' [Bull Trout ?], running from 6 oz. to 10 oz. each, were captured. Fishermen aver that when these are about ' you may whistle for fine Trout.' Those landed fetched good prices."

Amongst the Crustaceans my most interesting " finds " were two aged *Æsop's* Prawns (*Pandalus annulicornis*) with barnacles growing on the carapace, and a *Crangon vulgaris*, the posterior half of which was ivory-white.

NOTES FROM MILLPORT MARINE BIOLOGICAL STATION.

BY RICHARD ELMHIRST, F.L.S.

COMMON HERMIT-CRAB, *Eupagurus bernhardus* (L), ASSOCIATED WITH *Suberites domuncula*.

THE Hermit-Crab, which is usually found associated with the Sponge (*Suberites domuncula*), is *E. pubescens* (Kroyer), just as *E. prideauxi* is always found associated with the Cloaklet Anemone (*Adamsia palliata*).

Out of several thousand Common Hermit-Crabs which I have taken at one time or another there have been three associated with the above Sponge. In June last year I took a very small *Adamsia*, about 3 mm. wide, of course with an immature *E. prideauxi* inside. They are locally called "Strawberry Crabs." Fish do not seem to touch them for food, probably on account of the stinging powers of the *Adamsia*. The Common Hermit is, of course, a favourite item in the food of the Cod, Thornback, and other fishes.

MOULTING AND REGENERATION OF *Galathea strigosa*, Fabr.

In February, 1908, I took two adult specimens of this beautifully blue-banded Squat Lobster at low tide. One is fairly certain to find them during spring ebbs either on the "Eilans" in Millport Bay or about the Pier.

I first noticed the larger one (A) to be carrying spawn ("in berry" or "with coral") on May 5th; hatching began on the 16th, and of course lasted several days. On July 21st, 1908, she moulted, again in January, 1909, and again on the following July 21st. A few weeks later this specimen died.

The smaller one (B) spawned soon after A, moulted on July 31st, 1908, again January, 1909, again on July 12th, and lastly in December, but died a few days later.

In April, 1909, considerably after the second moult in captivity, A cast off her right cheliped when I was holding her in my

hand. At the next moult in July a new limb appeared about half the size of the old one, its growth having, of course, been indicated by a papilla about 1 cm. long projecting from the stump. On July 14th, two days after this new limb appeared, I induced her to throw it off by handling. At the following moult in December another and finer limb had appeared.

The following table gives the sizes of the chelipeds, chelæ, and carapace :—

		Length of Cheliped	Breadth of Hand	Length of Hand	<i>Carapace, length measured from the tip of the rostrum.</i>		
After Jan. moult 1909	old limb	6 cm.	1 cm.	2·8 cm.			
At July moult	old limb	6·2 "	1 "	2·9 "	After Jan. 1909 moult	Length 2·7	Breadth 3·6
	new limb	4·2 "	·6 "	1·9 "			
	old limb	6·4 "	1·1 "	3·1 "	After Dec. moult	2·85	4·0
At Dec. moult	new limb	4·6 "	·7 "	2·1 "			

G. strigosa lives well in the aquarium, but is of a very retiring disposition, and always tries to hide in the darkest corners of the tank. They keep themselves wonderfully clean, and do not become overgrown with small algæ. When disturbed they swim rapidly, generally on their backs; if they happen to be at the surface they make a great flapping, and show well the action by which they have earned the name of "Flappers" from the fishermen.

ON THE LOBSTER.

Lithodes maia, the Stone-Crab, becomes overgrown with small algæ, &c., in the aquarium, as also does the Lobster. The latter, however, cleans them off where he can reach them, as, for instance, round the eyes. Sometimes also considerable plants of *Laminaria* (oarweed) grow on the Lobster and Stone-Crab. The former generally keeps them trimmed, especially on its antennæ. This natural appearance of weeds on animals in the tanks, which at times must become traps for the spores of algæ, &c., brought in by the circulation, is quite a different thing from the dressing of themselves which has been noted in such Crabs as *Hyas*. A Lobster lately lost an antenna. After

the wound had healed the usual papilla appeared and grew in a coil, until there were about three turns in it. It, of course, showed indications of the future segments. At the next moult an antenna appeared, about two-thirds of the length of the old one, but with a curl of half a circle at the end of it.

Lobsters sometimes get an idea of working, and for several days will clear a path right round the sides of their tank, heaping up the pebbles on the bottom in the middle of the tanks. They have done this several times. One morning a Lobster which had cast his skin overnight solemnly set to work to bury his old skin among the pebbles. Newly moulted Lobsters seem to be regarded as delicacies by Congers.

"PULL" OF *Solen siliqua*.

When disturbed in its natural surroundings the Spout-fish is capable of quickly and strongly withdrawing into its hole in the sand. This is probably done as follows: Some Spout-fish I had in a dish of sea-water overnight had stretched out their feet and siphons. When I disturbed them some just contracted, but three others, which were very well extended, expanded the ends of their feet to about two inches in diameter, and withdrew suddenly. This is surely how they get such a grip of the sand. The inflated end of the foot with upturned edges was like a Mushroom-anchor; even a soft, fleshy Mushroom-anchor pressing into the sand would give an enormous hold. The foot of the Spout-fish is locally called the "pull" ("u" pronounced as in dull).

SPAWN OF *Oscanus* (*Pleurobranchus*) *membranaceus*.

When trawling on Ascog Bank, near Rothesay, several large masses of spawn came up. Each of these masses consisted of a soft gelatinous ribbon, about one inch thick and several feet long, in an irregular coil. A spiral thread, containing the egg-capsules, runs through the ribbon. There seems to be one egg in each capsule; the diameter of an egg is about .1 mm., and that of a capsule .16 mm. Several *Oscanus* came up in the same haul, and I suspected this was their spawn. I isolated some of them, and on August 29th, after three days in captivity, one of them deposited a coil of this spawn.

THE WOLF IN SCOTLAND AND ELSEWHERE.

By J. R. McClymont.

A FEW lines in the panegyric poem "Forth Feasting," by Drummond of Hawthornden, which was published in 1617 on the occasion of the visit of King James I. to Edinburgh, reveal certain interesting points of difference between field sports in the seventeenth century and at the present day. The lines run thus:—

"When years thee vigour gave, O then how clear
Did smother'd sparkles in bright flames appear !
Amongst the woods to force a flying hart,
To pierce the mountain wolf with feather'd dart,
See falcons climb the clouds, the fox ensnare,
Outrun the wind-outrunning dædal hare,
To loose a trampling steed amongst a plain
And in meand'ring gyres him bring again,
The press thee making place, were vulgar things."

The mental picture suggested by the flying hart forced into a wood by the tactics of its pursuers reminds us that the Normans hunted deer on horseback and on foot, employed dogs in the chase of them, and shot them with arrows; and it is to this mode of hunting Red Deer that Drummond alludes. It would be to the advantage of those who engaged in the hunt to drive the hart into a wood where its speed would be checked, and where it could be shot by hunters in ambush. The climbing of clouds by Falcons is an allusion to falconry, which survives from olden times without important change, and the outrunning of the Hare, dædal or fertile in resources, must have been akin to coursing.

Drummond names two other forms of outdoor diversion which are without counterpart in our days—at least within the British Isles—namely, setting snares for Foxes and piercing Wolves with feathered darts—"feather'd dart" being doubtless a periphrasis signifying "arrow." The employment of the epithet "mountain" might induce us to believe that a Wolf

inhabiting mountainous districts existed which differed in some respect from that which inhabited the Lowlands. There is, however, no evidence to support such an hypothesis, and we must therefore suppose that the epithet is employed by Drummond merely as a poetical embellishment. It is worthy of note that there is a melanistic form of the European Wolf, which is said to be most common in the Pyrenees, and which may have existed in Scotland when Drummond wrote.

An oral tradition, which assigns no date to the occurrence, and which is probably of little value, indicates the vicinity of Bridge of Allan as the locality in which a Wolf was last killed in Scotland. In Roxburghshire are several local names which indicate the presence of Wolves in that county. There is, for example, near the confluence of the Teviot and the Rule, the farm of Spittal-on-Rule, which very probably derives its name from having been one of those "spittals" or places of refuge which were provided for the benefit of travellers in danger from Wolves.

Boccaccio has a description of the mode in which Wolves attack a Horse. The incident which he describes is supposed to take place in a forest between Rome and Alagna; so an English version prints the name, but doubtless Anagni, about twelve miles north-west from Frosinone and about forty-five miles from Rome, is the town which is meant. The hero of the tale, Pietro Boccamazza by name, being overtaken by night in the forest, tethers his Horse to an oak, which he climbs for safety. Presently a pack of Wolves appears. The story proceeds thus: "Now, as for Pietro, he had but a dismal night of it, for he saw his Horse soon surrounded by a number of Wolves, which made him break his bridle, and he endeavoured to make his escape, but was so encompassed that he could not, and he defended himself with kicking and biting for some time, till at last he was pulled down and torn all to pieces, and, having devoured him to the very bones, they went away."

In conclusion, it may be remarked that if, as is alleged, James I. introduced a foreign variety of the Roedeer into Great Britain (thereby adding one more reason why Wolves should be exterminated), he cannot have been quite as indifferent to the interest of the chase as Drummond supposed him to be.

Hobart, Tasmania.

Zool. 4th ser. vol. XIV., February, 1910.

G

NOTES AND QUERIES.

MAMMALIA.

Bechstein's Bat (*Myotis bechsteini*): a Correction.—The Rev. J. E. Kelsall (*ante*, p. 30) has made one example of Bechstein's Bat into two. The mistake doubtless arose from Mr. Millais's original record of the specimen (P.Z.S. 1901, ii. 216) as captured "in the neighbourhood of Henley-on-Thames," which is, as everyone knows, in Oxfordshire—that is, on the north bank of the river; but Mr. Noble's caves in the chalk are on the south bank, which is Berkshire, in Remenham parish.—A. H. COCKS (Poynetts, Skirmett, near Henley-on-Thames, but in Bucks).

AVES.

Reappearance of the Bearded Tit (*Panurus biarmicus*) in an Old Haunt.—On January 29th I was pleased to hear from my brother, Mr. A. M. Rope, that he had lately seen this bird at a spot where, up to about forty years ago, it was often to be found. He was first attracted by its note, and only got a distinct view of two birds, but thought there were probably more; for it is a well-known habit of this species to be constantly flitting from place to place in small flocks or family parties, after the manner of the Long-tailed Tit. For obvious reasons I refrain from mentioning the exact locality, which is, however, not far from the Suffolk coast. Drainage has greatly reduced the area of its former haunts at the place referred to, and grazing marshes now occupy the site of large beds of reeds. The last note I have on this beautiful little bird at this old home of the species is as follows:—"Nov. 13th, 1873. Walked round the 'reedland,' and saw three flocks of Bearded Tits, each containing about eight or nine individuals." From the year 1871 to the date of the above note we often used to fall in with them, and hear their musical tinkling note as they came trooping along, only just skimming the tops of the reeds.—G. T. ROPE (Blaxhall, Suffolk).

Glossy Ibis (*Plegadis falcinellus*) at Yarmouth.—On December 2nd, 1909, near the River Bure, about two miles north-west of Great Yarmouth, a strange bird was seen by a waterman. On reaching home he informed a "gunner" friend, who proceeded to the spot immediately. Meanwhile the bird had retired to the marshes, where it was found standing in a pool of water, where the gunner shot it.

He showed it to the waterman, who identified it as an Ibis, or Black Curlew. It is now in my possession. "Black Curlew" is the name given to the bird by the Breydon gunners, owing to the resemblance of the bills in these birds.—B. DYE (Great Yarmouth).

Slavonian Grebe in Shropshire and Worcestershire.—On the 11th December last my brother and I observed a Slavonian Grebe (*Podiceps auritus*) on the River Severn, in the parish of Dowles, some four hundred yards above Bewdley Bridge. When first noticed it was swimming about in some quiet water near the river-bank; it was very tame, allowing us to approach within about fifteen yards and watch its movements for several minutes. It occasionally dived whilst we were near, in some instances coming up again even closer than before, and it remained above water at longer intervals. Eventually it got caught in the swift current then running, whence it was quickly carried down stream and across to the Worcestershire bank of the river.—J. STEELE ELLIOTT (Dowles Manor, Shropshire).

Ornithological Report from Chester.—Permit me to record the following:—

Two immature Peregrine Falcons (*Falco peregrinus*).—Bala, April 19th, 1909.

Osprey (*Pandion haliaëtus*).—Adult female, Capenhurst, May 7th, 1909. The stomach of this infrequent visitor was quite empty.

Great Northern Diver (*Colymbus glacialis*).—Shot December 21st, 1891, during extensive floods, Helsby Marsh.

Immature Black-throated Diver (*C. arcticus*).—Shot January 18th, 1910, River Dee, at Corwen. The gullet of this bird contained seven Common Trout of different ages; the stomach was apparently filled with bones of the same, together with some small pebbles.—A. NEWSTEAD (Grosvenor Museum, Chester).

Ornithological Observations in North-east Surrey, 1909.—The most interesting notes for the year, for this portion of Surrey, are the occurrence of the Golden Plover on Wimbledon Common, whence it had not previously been recorded, and the Common Tern, White Wagtail, and Lesser Black-backed Gulls observed on autumn migrations at Barn Elm Reservoir. At least one hundred and forty-three species have already been recorded from this corner of Surrey; of these, one hundred and fifteen have been seen within the last ten years; this shows the district to be one of the richest, ornithologically, in the county. The Barn Elm Reservoir is comparatively new ground for the observation of bird-life. The only former records from this spot being as follows:—

GREY PHALAROPE.—One reported to have been shot here in October, 1870 (The 'Field').

KITTIWAKE GULL.—Observed a few years ago by Mr. Felton; while Mr. Cornish mentions having seen Tufted Ducks and two Great Crested Grebes here in February, 1902.

WHEATEAR.—One on Wimbledon Common, Sept. 14th; rarely noticed in the district when on autumn migration.

WHINCHAT.—A fairly common summer visitor, usually arriving about April 15th; nests frequently on Wimbledon Common and in Richmond Park.

REDSTART.—Fairly common in Richmond Park during the spring and summer, nesting in the old thorns, &c.; occurs, but does not appear to nest, on Wimbledon Common.

CHIFFCHAFF.—This little Warbler occurs in all parts during the summer, but is nowhere numerous. First heard its welcome note this year on April 8th, Wimbledon Common; also heard it as late as October 6th last, near Raynes Park.

WILLOW-WARBLER.—The most numerous Warbler, usually arrives during the first week in April; nests even on Barnes Common amongst the bracken.

COLE TIT.—Fairly common, especially in Richmond Park, where it nests freely in the plantations.

WHITE WAGTAIL.—Noted one at Barn Elm Reservoir on Oct. 24th; it is probably a regular spring and autumn migrant there.

YELLOW WAGTAIL.—A common summer visitor to district, usually to be seen during the second week in April by the Pen Ponds; nests freely in the reservoir grounds at Barnes.

SWALLOW.—First seen on April 7th about Pen Ponds, while in the autumn they lingered on the reservoirs till Oct. 24th, in spite of occasional cold winds.

SAND-MARTIN.—A regular visitor during spring and autumn; may be seen on the Pen Ponds by the second week in April, while they are very numerous during October on the reservoirs.

TREE-CREEPER.—Fairly common resident in Richmond Park, only occasionally straying on to Putney Heath and Wimbledon Common.

REED-BUNTING.—A regular visitor, though not common, to Richmond Park and Wimbledon Common in the spring. Occasionally seen in the park and in reservoir grounds during the winter, it is known at the latter place as the "Blackcap."

KINGFISHER.—More often seen during the winter; one on Pen Ponds Dec. 2nd; also a pair on reservoirs during November and December.

POCHARD.—A flock of eight arrived on reservoirs Nov. 11th; they had increased to over one hundred by the 21st of the month. They are very shy, and usually keep well out towards the centre.

COOT.—Generally a few are to be seen on Pen Ponds, while they regularly visit the reservoirs in small numbers for the winter.

GOLDEN PLOVER. — One was picked up injured on Wimbledon Common during severe weather in mid-March; it died a day later, and found its way into a local collection.

COMMON TERN.—Observed one flying about the reservoirs on Oct. 10th. The well-known "Sea-Swallow" is probably a regular visitor on migration.

BLACK-HEADED GULL.—A very numerous winter visitor to the Thames; it may be seen often on Wimbledon and Barnes Commons and in Richmond Park. They fly in thousands over Chelsea and Fulham from the London Parks and river adjacent to the city, to their roosting-grounds at Barn Elms. I have often seen some of the reservoirs covered with sleeping Gulls.

LESSER BLACK-BACKED GULL.—A dozen frequented the reservoirs throughout October, remaining there all day, whereas the commoner Gulls spend most of their time up in London.

GREAT CRESTED GREBE.—Fairly common on reservoirs during the winter months, eight being there on Oct. 2nd, ten on Oct. 15th, fifteen on Oct. 24th, eighteen on Nov. 21st, and twenty-five, the largest number I have seen together, by the end of December.

Mr. Mouritz, in Zool. 1907, p. 95, remarks upon the erratic way in which *P. cristatus* appeared upon the Pen Ponds during the early part of the year. This is undoubtedly accounted for by the presence of this species during the winter months on the reservoirs at Barn Elms.—WILLIAM A. TODD (62, Festing Road, Putney, S.W.).

OBITUARY.

EDWARD SAUNDERS, F.R.S.

WE regret to announce the death of Mr. EDWARD SAUNDERS, which took place at Bognor on February 6th. He had been out of health for some time, and had gone to Bognor with the hope that a change would restore him. He was born at East Hill, Wandsworth, on March 22nd, 1848, and was a son of William Wilson Saunders, the well-known naturalist, from whom he inherited his love for entomology. From 1865 to the time of his death he was in the City at "Lloyd's." For many years he devoted himself to the study of

Buprestidæ, of which he published an excellent synonymic catalogue in 1871. He also published in 1873 a 'Catalogue of the Species contained in the genus *Buprestis* of Linnæus. He contributed numerous papers relating to this Family in the 'Transactions' of the Entomological Society (1867-1872), in the 'Journal' of the Linnean Society (1870-1873), and in 'Insecta Saundersiana' (1869). He formed a fine collection of these insects, which became the property of the British Museum in 1874; it consisted of 7267 specimens, of which 364 were types. He also formed collections of British Coleoptera, Hemiptera, and Hymenoptera, and extended his studies of the two latter Orders to the whole of Europe, including the Mediterranean fauna. He contributed numerous notes and descriptive papers to the 'Entomologist's Monthly Magazine' on Hemiptera from 1869, and on Hymenoptera from 1880. Some of the more important relate to the species collected by the Rev. A. E. Eaton in Algeria, many of which were new to science. He published a 'Catalogue of British Hemiptera' in 1876. His most important separate works are 'The Hemiptera Heteroptera of the British Islands,' illustrated by thirty-two plates, in 1892. This was followed in 1896 by a similar work, 'The Hymenoptera Aculeata of the British Islands,' a standard work, illustrated by fifty coloured plates. He was one of the Editors of the 'Entomologist's Monthly Magazine' from 1880, and was a Fellow of the Entomological Society from 1865, the Linnean Society from 1869, and in 1902 was elected a Fellow of the Royal Society.

He married in 1872, and leaves a widow and a large family, one son being a clergyman; others have entered different professions, and one represents him at "Lloyd's."

Edward Saunders was a good man, whom it was both a pleasure and a profit to know, quiet and retiring in his manners, always ready to look at the best side of things, and willing at all times to assist his entomological friends, by whom he will be greatly missed.

C. O. W.

NOTICES OF NEW BOOKS.

A History of the Birds of Kent. By NORMAN F. TICEHURST, M.A., &c. Witherby & Co.

THERE can be little doubt but that in this book we have the standard history of the birds of Kent, and that it will receive general acceptance as of that authority. It represents the work

of sixteen years, it is written by one who is thoroughly master of his subject, and he has been assisted by the information and notes of all the best ornithologists in the county. The literary and scientific standard of the books devoted to county ornithology is clearly a rising one, and is no longer a matter only of conscientious compilation; records must be appraised, and where possible verified; information must be sought from those who never publish, and individual experience and observation must be the foundation of the volume. Not only must well-known collections be thoroughly overhauled, but how often one finds a rare bird, badly stuffed and cased, on the walls of an inn, or in the interior of a cottage! In the Introduction Mr. Ticehurst gives us a good account of the Kentish birds preserved in public and private collections, and there is another feature which should obtain hearty and general commendation. We read in the Preface: "Where a rare species has been recorded from a locality perhaps only a hundred yards beyond the actual boundary it would be absurd to exclude it from all mention in the present work." This removes one of the haunting suspicions one experiences in reading a county book on birds. A hedge, a stream, a lane may in places divide counties, and may thus limit a distribution or confine a record. Mr. Ticehurst has also pursued the clue of many recorded rarities, and has located the specimens, using all the perseverance of a trustworthy political agent in following up removed electors.

As regards the real material of the book, the history of the birds themselves, there is little doubt that a further note might be added here and there, but at the same time the reader will wonder how so much has been included; bird-lovers in Kent will find all they want, and if any supplementary notes are to be added there are opportunities for publishing elsewhere. Any young naturalist who carefully reads the pages will acquire much sound ornithological information, and he need not consider that this only applies to a Kentish reader. The illustrations are principally of the birds' haunts and breeding places.

In the Bibliography we find no mention of 'Greenwich Park,' by A. D. Webster, its Superintendent, and which was published in 1902. In this publication is given a list of eighty-one species of birds found there, thirty-four of which are said to breed in the Park.

Nimrod, Ramrod, Fishing-Rod, and Nature Tales. By J. WHITAKER, F.Z.S. H. B. Saxton, Nottingham.

MR. WHITAKER, who is well known to the readers of 'The Zoologist' as an ornithologist, has in this book shown himself to be an all-round sportsman, not only with the gun and fishing-rod, but also at the hunt and on the turf. This catholicity in pursuit gives these pages the charm of a naturalist writing as a sportsman, and a sportsman as a naturalist, and we hope that one day the author may give a larger volume of personal reminiscences derived from these varied experiences.

Visits to Selborne and Walton, with illustrations of the graves of both Gilbert White and Charles Waterton, will appeal to all naturalists. As regards the Cuckoo, some interesting points are detailed. Thus: "Early on in May the call is *cuc-koo*; about the middle of June it is *zuc oh*; after this the voice commences to break, and they call *cuc-cuc-cuc-ou*." Like many other field ornithologists, Mr. Whitaker is "no believer of the *March Cuckoo*," and he gives some amusing instances of the way in which this belief has arisen.

"A Winter's Day with the Perch" is one of those exceptional *opportunities* which does not come in the way of all anglers; but why were only worms tried? A small Gudgeon might have effected a revelation in such a water, and the writer has not yet forgotten the horror of hooking and losing the Perch of his lifetime with that bait at a weir on the Mole a season ago. "Seven Hundred Miles for two Snipe" is one of those experiences that befall all, the entomologist as well as the sportsman. Did we not at one Yuletide in the Transvaal drive eighty miles over heavy soddened veld to the proper locality and at the right time for the capture of four species of insects? We only brought two back, one of which was given to us and the other we purchased.

The illustrations comprise many varieties of birds, in which Mr. Whitaker's collection is known to be particularly rich, and the volume sustains its interest from start to finish.

